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A radio talk by Dr. Henry G. Knight, Chief, Bureau of Chemistry and Soils, delivered in the Department of Agriculture period of the National Farm and Home Hour, Wednesday, November 9, 1932, broadcast by a network of 48 associate NBC radio stations.

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SALISBURY:

Dr. Henry G. Knight, the chief of the Bureau of Chemistry and Soils, continues today his series of reports to Farm and Home Hour listeners on results of recent chemical research of service to producers and users of farm products.

Dr. Knight already has given us the facts about research results on chemical problems connected with producing, processing, shipping, and storing apples, citrus fruits, cotton and cottonseed, fruits and vegetables for canning, wheat, the farm sirup crops of the South, and naval stores.

Since this is National Honey Week, Dr. Knight today will review for us the results of recent chemical research on processing honey. This work of the scientists promises to be of value to honey producers, to food merchants who retail honey, and to the consumers who use honey. Ladies and gentlemen, Dr. Henry G. Knight.

KNIGHT:

Thank you, Salisbury, and greetings to you Farm and Home Hour listeners.

Many of you listening in are producers of honey, at least on a small scale. I am sure that most of you are fond of honey as a table delicacy, one of nature's finest sweets.

In our chemical research on this product, we are trying to find methods of preparing extracted honey for the market so that it will have a better appearance, will not granulate, and will not darken or decompose when used in cooking.

If we can develop practical processes for treating extracted honey that will overcome these difficulties of the present product, no doubt you consumers will use more honey. That will help the producers, of course. It also will help the people who sell honey, and will enable them to bring down the prices to buyers, since it will increase the number of sales and thus enable the merchant to handle honey on a smaller margin of profit for each individual sale. Because foreign countries are buying less of our honey than formerly, our honey producers are very much in need of a wider domestic market for their commodity. Some foreign countries, especially Germany, have increased their import duties on honey with the object of encouraging local production and thus have restricted the market for our honey.

Now probably more people in this country would buy extracted honey if they were always offered a product that was brilliantly clear, that could be used in cooking with assurance that it would not darken or decompose, and that

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would not granulate. So our chemists are working to find out a method of treating extracted honey that will create a product meeting these requirements.

The first problem of the scientists was to find out why extracted honey was sometimes cloudy instead of clear, why it granulated, and why it turned dark and decomposed at cooking temperatures. They seem to have found the answer to this problem. They have discovered that most of the troubles with extracted honey are caused by small amounts of very finely divided material, colloidal in character, suspended in it. These colloids are present in the honey when it is in the honeycomb.

The first researches on extracted honey also indicated that the colloids, along with small air bubbles, sometimes cause a thin layer of foam or scum to appear on the surface of extracted honey. Of course, this layer of scum does not affect the edibility of honey, but it does spoil its appearance. The presence of the colloids seems to contribute to the formation of the air bubbles.

So evidently the problem of the chemists is to find a means of removing these colloids from extracted honey. The present methods used by packers to process honey before putting it up in bottles or tins remove the larger particles of suspended matter and most of the air bubbles, but they do not take out the very finely divided suspended matter -- the colloids.

Our chemists have worked out an improvement on this honey treating process that will remove the colloids. They begin the process by diluting extracted honey somewhat with water. Then they treat the solution with small amounts of a suspension of a clay known as "bentonite." This finely divided clay coagulates the very, very small particles of colloidal matter. The coagulated particles are big enough so that you can separate them out by the usual process of filtration now used by honey packers.

So far, so good. But you have to take out the extra water which you've added. The chemists get rid of the water by evaporating the clarified honey in a vacuum at a low temperature. This temperature is so low that it does not injure the sugar in the honey.

Well, this rather complicated process works a great improvement in the appearance of honey. The clarified honey is brilliantly clear -- as clear as any sirup. It will not granulate so quickly as unclarified honey. No layer of foam or scum forms at the top. The honey does not turn dark or decompose at the temperatures usually employed in making candy and bakery goods, so it can now be used in cooking.

Our chemists have attempted to induce the formation of a foam or scum layer on the surface of the clarified honey. But no foam or scum layer could be formed which shows the success of the process.

They have also made tests on the granulation of ordinary honey and clarified honey. They clarified alfalfa honey of the type that usually granulates easily. After the clarification, this honey stayed liquid for 7 months before a single crystal appeared. Furthermore, they tested the clarified honey as a sweetener in baked goods. It did not darken at low temperatures like the unclarified honey.

Of course, the method of clarification has to be improved so that it will be adapted to commercial use, and our chemists are at work on this problem now.

If and when they finally solve it, the benefits will come to both producers and consumers of honey, and to the retailers of honey also.

Well, there's your report on chemical research on honey. I understand the Department of Agriculture programs will not be on the air next week because of the broadcast from the meetings of the Land Grant College Association and from the American Royal Livestock Show, but I shall return to the Farm and Home microphone on Wednesday, November 23, to give you a report on our research in the interest of producers and feeders of hay.

CHAPTER 1

The first part of the book is devoted to a general discussion of the principles of the theory of the structure of the atom. It is in this part that the reader will find the foundations of the modern atomic theory, which is based on the quantum theory of light and the quantum theory of matter.

The second part of the book is devoted to a detailed discussion of the structure of the atom. It is in this part that the reader will find the details of the quantum theory of the atom, which is based on the quantum theory of light and the quantum theory of matter.

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